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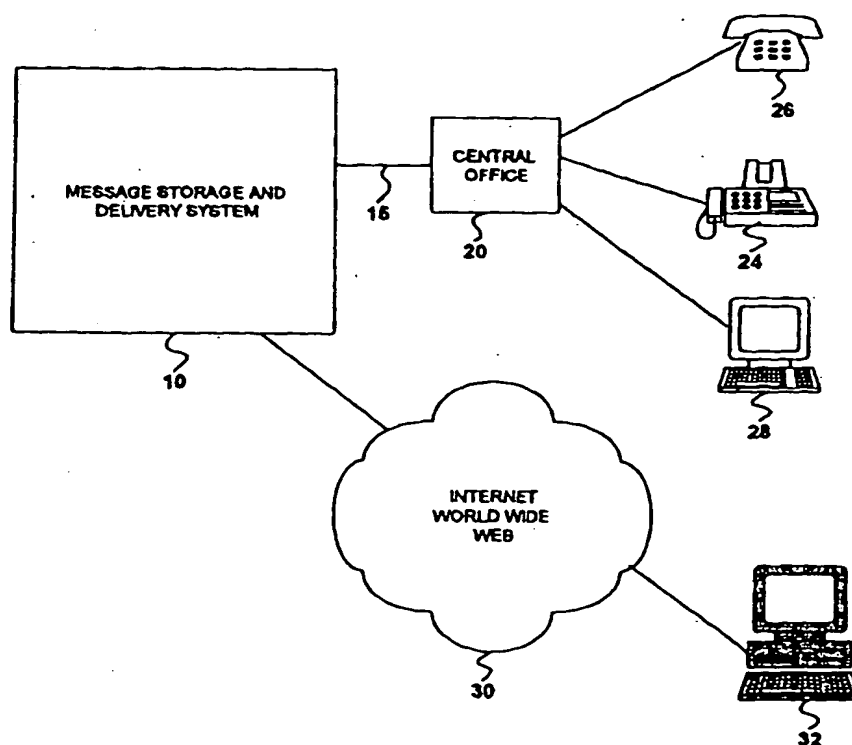
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(54) Title: MESSAGE STORAGE AND DELIVERY SYSTEM

(57) Abstract

A Message Storage and Deliver System (MSDS) (10) is connected to a plurality of DID phone lines and receives facsimile messages, voice messages, and data messages. The messages are stored in memory and are also converted into appropriate hyper-text mark-up language (HTML) (30) files. The users can then connect to the MSDS (10) through the Internet (30). The users of the MSDS (10) therefore have the advantage of being able to receive their messages at any time and at any location at a reasonable cost. The user can also telephone the MSDS (10) to listen to messages or to alter the service provided by the MSDS (10).



With a fifth option, a full size image of each page is transmitted to the user's computer 32. The user can scroll through the pages of the facsimile message and easily read the contents of each page. If the user wants the message
5 downloaded to the computer 32, the user selects the message and the HTTPD within the MSDS 10 transmits the message to the user's computer 32 through the Internet 30.

As discussed above, after the database is updated at step 54, the MSDS 10 will generate additional information based
10 upon the option selected for displaying the facsimile messages. More specifically, as shown in Fig. 4(A), if the first option has been selected, as determined at step 100, then at step 102 the MSDS 10 will generate the textual listing of the facsimile messages with anchors or references to the
15 respective facsimile files. The HTML files are then moved to an Internet Server at step 104.

If the first option is not selected, the MSDS 10 next determines whether the second option has been selected at step 106. With the second option, the facsimile messages are
20 listed along with a reduced size image of the cover page. To generate this information, the cover page is extracted from the facsimile file at step 108 and a reduced size HTML image of the cover page is created at step 110. At step 112, a listing of the facsimile messages is generated with a
25 thumbnail view of each cover page linked to its respective facsimile file. The generated HTML files are then sent to the Internet Server at step 104.

When the third option is selected, as determined at step 114, a full size image of the cover page is sent to the computer 32. The full size image of the cover page is generated by first extracting the cover page from the facsimile file at step 116. Next, the cover page is converted into a full size HTML image at step 118 and, at step 120, the listing is generated with the embedded cover page linked to the facsimile file.

If, at step 122, the fourth option is determined to be selected, then a reduced size image of each page is provided to the user with the option of enlarging the page to view the contents of the page more clearly. With reference to Fig. 4(B), the information necessary for the third option is produced by first extracting the first page of the facsimile message at step 124. A reduced size HTML image is created at step 126 and then a full size HTML image is created at step 128. At step 130, the listing is generated with embedded thumbnail images of the pages with links to the full size images. If the page is not the last page, as determined at step 140, then the next page is extracted at step 142 and steps 126 to 130 are repeated to generate the HTML files for the other pages of the facsimile message. After the last page has been converted into an HTML file according to the third option, the files are moved onto the Internet Server at step 104.

At step 144, the MSDS 10 determines whether the fifth option has been selected. The fifth option provides the user with a full size image of each page of the facsimile message.

While only five options have been discussed, the invention may be practiced with additional options. Consequently, with additional options and with the fourth option not being selected, the MSDS 10 would next determine whether one of the additional options have been selected. With the preferred embodiment of the invention having only five options, however, the MSDS 10 will assume that the fifth option has been selected if none of the first four options were found to be selected.

10 The information necessary to display the pages of the facsimile message according to the fifth option is generated by first extracting the first page of the facsimile message at step 146. At step 148, a full size HTML image of the page is created and, at step 150, a listing is generated with an
15 embedded image and links to previous and next pages. When the page is not the last page, as determined at step 152, the MSDS 10 extracts the next page and generates the HTML file for that page. After all pages have been converted into HTML files according to the fourth option, the files are sent to the
20 Internet Server at step 104.

While Figs. 4(A) and (B) describe the operations of the MSDS 10 at the time a message is received, Fig. 5 depicts an overall flowchart of operations for the MSDS 10 when the user requests a page of information in a display format other than the user's preferred option of displaying the message. Fig. 5
25 is therefore a more detailed explanation of how the MSDS 10 generates the necessary information at step 82 of Fig. 3.

In general, as shown in Fig. 5, the MSDS 10 first determines the type of image that is needed at step 82a. For example, at this step, the MSDS 10 will determine whether images are unnecessary, whether an image of just the cover page is necessary, whether an image is needed for every page, and whether the image needs to be a full size, a reduced size, or both full and reduced sized images. At step 82b, the MSDS 10 determines whether the image has already been created. If the image has not been created, then at step 82c the MSDS 10 will extract the page from the base facsimile file and, at step 82d, generate the required HTML image. As discussed above, the required image may be for just the cover page, for all the pages, and may be a full size and/or a reduced size image of the page. At step 82e, the image is embedded with links or anchors to other HTML files. These links or anchors might be references to the next and previous pages and also to the next and previous facsimile messages. Finally, the HTML file having the embedded image and links is sent to the user at step 80 in Fig. 3.

The process for converting a facsimile message into HTML files according to the fifth option will be described with reference to Fig. 6. This process will occur at step 54 when the message is received and when the fifth option is the user's preferred option of displaying the messages. It should be understood that a similar type of process will also occur when the user requests a page of information according to the fifth option when the user is retrieving a facsimile message and the fifth option is not the user's preferred option. The

conversion processes according to the other options will become apparent to those skilled in the art and will therefore not be discussed in further detail.

With reference to Fig. 6, when the facsimile message is received, the message is in a Tagged Image File Format/Facsimile (TIFF/F) and each page of the facsimile message is split into a separate file. Each page of the facsimile message is then converted from the TIFF/F format into a Portable Pixel Map (PPM) format. The PPM files are next converted into separate Graphic Interchange Format (GIF) files and then into separate HTML files. Thus, each page of the facsimile message is converted into a separate HTML file. The TIFF/F files may be converted into PPM with an available software package entitled "LIBTIFF" and the PPM files may be converted into GIF files with an available software package found in "Portable Pixel Map Tools."

The invention is not limited to this exact conversion process or to the particular software packages used in the conversion process. For instance, the TIFF/F files may be converted into another portable file format, through any other type of intermediate format, or may be converted directly into the GIF format. Further, instead of GIF, the facsimile messages may be converted into JPEG, BMP, PCX, PIF, PNG, or any other suitable type of file format.

The files may be identified with any suitable filename. In the preferred embodiment, the files for each user are stored in a separate directory assigned to just that one user because an entire directory for a given user generally can be

protected easier than the individual files. The memory, however, may be organized in other ways with the files for a single user being stored in different directories. The first part of the filename is a number preferably sequentially determined according to the order in which messages arrive for that user. The preferred naming convention for ending the filenames is depicted in Fig. 6. Each page of the facsimile message is saved as a separate file with an extension defined by the format of the file. Thus, the files will end with an extension of ".TIFF," ".PPM," ".GIF," or ".HTML" according to the format of the particular file. In the example shown, the separate pages have filenames which end with the respective page number, for instance, the first page ends with a "1." The files, however, are preferably terminated with a letter or multiples letters to indicate the order of the pages. For instance, page 1 might have an ending of "aa," page 2 might have an ending of "ab," etc. The invention, however, is not limited to the disclosed naming convention but encompasses other conventions that will be apparent to those skilled in the art.

As shown in Fig. 6, in addition to the GIF files representing the pages of the facsimile message, the HTML files include a number of anchors or references. In the example shown, the first HTML file has an anchor a for the "Next Page." Anchor a is defined as a = Next Page and will therefore reference the second HTML file when a user selects the "Next Page." The second HTML file has an anchor b for the "Previous Page" and an anchor c.

for the "Next Page" and the third HTML file has an anchor d for the "Previous Page." With these particular HTML files, the user can scroll through each page of the facsimile message and view a full size image of the page.

5 Each HTML file preferably contains anchors in addition to those relating to "Next Page" and "Previous Page." For instance, each HTML file may contain an anchor to the next facsimile message, an anchor to the previous facsimile message, and an anchor to return to the facsimile list. The
10 HTML files preferably contain anchors relating to "Save" and "Delete." When the "Save" anchor is selected, the user would be able to save the message under a more descriptive name for the message. The "Delete" anchor is preferably followed by a inquiry as to whether the user is certain that he or she wants
15 to delete the message. Other anchors, such as an anchor to the general listing, will be apparent to those skilled in the art and may also be provided.

 Fig. 7 provides an example of a display according to the fifth option for the first page of the facsimile message shown
20 in Fig. 6. The headings of the display provide information on the telephone number from where the message was sent, the date and time the message was received at the MSDS 10, and an indication of the page of the message being displayed. The main portion of the display is the full size image of the
25 page. At the bottom of the display, an anchor or link is provided to the "Next Page" and another anchor is provided to the "Return to Fax Listing." Additional information may also

CLAIMS

I claim:

- 1 1. ~~A network message storage and delivery system,~~
2 comprising:
3 means for receiving an incoming call and for
4 detecting an address signal associated with said incoming
5 call, said address signal associated with a user of said
6 message storage and delivery system;
7 means for receiving a message accompanied with said
8 address signal, said message being in a first file
9 format;
10 means for converting said message from said first
11 file format to a second file format;
12 means for storing said message in said second file
13 format in a storage area;
14 means for receiving a request from said user for
15 said message and for retrieving said message from said
16 storage area; and
17 means for transmitting at least a portion of said
18 message in said second file format to said user;
19 wherein said portion of said message is transmitted
20 to said user over the network and said second file format
21 is a mixed media page layout language.

1 2. The message storage and delivery system as set
2 forth in claim 1, wherein said network comprises the
3 Internet.

1 3. The message storage and delivery system as set
2 forth in claim 1, further comprising means for notifying
3 said user of said message.

1 4. The message storage and delivery system as set
2 forth in claim 3, wherein said notifying means comprises
3 means for sending an E-mail message to said user.

1 5. The message storage and delivery system as set
2 forth in claim 3, wherein said notifying means provides
3 said user with information on a type of said message.

1 6. The message storage and delivery system as set
2 forth in claim 3, wherein said notifying means comprises
3 means for paging said user.

1 7. The message storage and delivery system as set
2 forth in claim 6, wherein said paging means comprises an
3 alphanumeric pager.

1 8. The message storage and delivery system as set
2 forth in claim 1, wherein said message comprises a
3 facsimile message.

1 9. The message storage and delivery system as set
2 forth in claim 1, wherein said message comprises a data
3 message.

1 10. The message storage and delivery system as set
2 forth in claim 1, wherein said message comprises a voice
3 message.

1 11. The message storage and delivery system as set
2 forth in claim 1, wherein said means for receiving said
3 incoming call receives said incoming call over a DID
4 trunk.

1 12. The message storage and delivery system as set
2 forth in claim 11, wherein said means for receiving said
3 incoming call receives incoming calls over a plurality of
4 DID trunks.

1 13. The message storage and delivery system as set
2 forth in claim 1, wherein said means for receiving said
3 message detects whether said message comprises any one of
4 a facsimile message, a data message, or a voice message.

1 14. The message storage and delivery system as set
2 forth in claim 1, wherein said second file format
3 comprises a standard generalized mark-up language.

1 15. The message storage and delivery system as set
2 forth in claim 14, wherein said standard generalized
3 ~~mark-up~~ language comprises hyper-text mark-up language.

1 16. The message storage and delivery system as set
2 forth in claim 1, wherein said means for receiving said
3 request from said user comprises a hyper-text protocol
4 daemon for receiving said request over the Internet.

1 17. The message storage and delivery system as set
2 forth in claim 1, wherein said message comprises a
3 facsimile message, said first file format comprises
4 TIFF/F, said second file format comprises HTML, and said
5 converting means embeds a reduced size image of at least
6 one page of said facsimile message within said second
7 file format.

1 18. The message storage and delivery system as set
2 forth in claim 17, wherein said reduced size image of
3 said one page is provided as an anchor to a full size
4 view of said one page.

1 19. The message storage and delivery system as set
2 forth in claim 1, wherein said message comprises a
3 facsimile message, said first file format comprises
4 TIFF/F, said second file format comprises HTML, and said
5 converting means embeds a full size image of at least one

6 page of said facsimile message within said second file
7 format.

1 20. The message storage and delivery system as set
2 forth in claim 1, wherein said message comprises a
3 facsimile message, said first file format comprises
4 TIFF/F, said second file format comprises HTML, and said
5 converting means generates a listing of all facsimile
6 messages associated with said user.

1 21. The message storage and delivery system as set
2 forth in claim 1, wherein said message comprises a
3 facsimile message and said system further comprises
4 previewing means for sending said user a listing of all
5 facsimile messages for said user along with a reduced
6 size image of a first page for each facsimile message.

1 22. The message storage and delivery system as set
2 forth in claim 21, wherein each reduced size image of the
3 first page comprises an anchor and said transmitting
4 means transmits the facsimile message associated with
5 said anchor to said user when said user selects said anchor.

1 23. The message storage and delivery system as set
2 forth in claim 1, wherein said message comprises a
3 facsimile message and said system further comprises
4 previewing means for sending said user a listing of all

5 facsimile messages for said user along with a full size
6 image of a first page of each facsimile message.

1 24. The message storage and delivery system as set
2 forth in claim 1, wherein said message comprises a
3 facsimile message and said system further comprises
4 previewing means for sending said user a reduced size
5 image of each page of said facsimile message.

1 25. The message storage and delivery system as set
2 forth in claim 24, wherein each reduced size image
3 comprises an anchor to a full size image of the
4 respective page.

1 26. The message storage and delivery system as set
2 forth in claim 1, wherein said message comprises a
3 facsimile message and said system further comprises
4 previewing means for sending said user a full size image
5 of each page of said facsimile message.

1 27. The message storage and delivery system as set
2 forth in claim 1, wherein said means for receiving said
3 incoming call comprises a central processor and said
4 means for receiving said request from said user comprises
5 a network server.

1 28. The message storage and delivery system as set
2 forth in claim 1, wherein said message comprises a
3 facsimile message and said second file format comprises a
4 grey scale image of said facsimile message.

1 29. The message storage and delivery system as set
2 forth in claim 28, wherein said image of said facsimile
3 message comprises a full size image of said facsimile
4 message.

1 30. The message storage and delivery system as set
2 forth in claim 28, wherein said image of said facsimile
3 message comprises a reduced size image of said facsimile
4 message.

1 31. The message storage and delivery system as set
2 forth in claim 1, wherein said message comprises an audio ^{2.4.1}
3 message and said transmitting means transmits all of said
4 message to said user, said system further comprising
5 means for playing said audio message in real time as said
6 message is received by said user.

1 32. A network message storage and delivery system,
2 comprising:

3 a central processor for receiving an incoming call,
4 for detecting an address signal on said incoming call,
5 for detecting a message on said incoming call, and for
6 placing said message in a storage area, said address
7 signal being associated with a user of said network
8 message storage and delivery system;

9 a network server for receiving said message from
10 said storage area, for converting said message into a
11 mixed media page layout language, and for placing said
12 message in said storage area;

13 wherein when said network server receives a request
14 from said user over said network, said network server
15 transmits at least a portion of said message over said
16 network to said user.

1 33. The network message storage and delivery system
2 as set forth in claim 32, wherein said network comprises
3 ~~the Internet and said network server comprises an~~
4 Internet server.

1 34. The message storage and delivery system as set
2 forth in claim 32, wherein said central processor
3 comprises a pulse/tone decoder for detecting said address
4 signal and a digital signal processor for detecting said
5 message.

1 35. The message storage and delivery system as set
2 forth in claim 32, wherein said network server comprises
3 a hyper-text transfer protocol deamon for receiving said
4 request from said user.

1 36. The message storage and delivery system as set
2 forth in claim 32, wherein said network server sends said
3 user an E-mail message after said message has been
4 received by said central processor.

1 37. The message storage and delivery system as set
2 forth in claim 32, wherein said network server is
3 connected to a paging system for paging said user after
4 said message has been received by said central processor.

1 38. The message storage and delivery system as set
2 forth in claim 32, wherein said central processor is

3 connected to a DID trunk and said incoming call is
4 received over said DID trunk.

1 39. The message storage and delivery system as set
2 forth in claim 32, wherein said central processor is
3 connected to a plurality of DID trunks and said incoming
4 call is received over one of said DID trunks.

1 40. The message storage and delivery system as set
2 forth in claim 32, wherein message comprises a facsimile
3 message and said network server converts said facsimile
4 message from TIFF/F into a hyper-text mark-up language
5 file.

1 41. The message storage and delivery system as set
2 forth in claim 32, wherein message comprises a data
3 message and said network server converts said data
4 message into a hyper-text mark-up language file.

1 42. The message storage and delivery system as set
2 forth in claim 32, wherein message comprises a voice
3 message and said network server converts said voice
4 message into a hyper-text mark-up language file.

1 43. The message storage and delivery system as set
2 forth in claim 32, wherein said message comprises a
3 facsimile message and said network server generates a
4 grey scale image of said facsimile message.

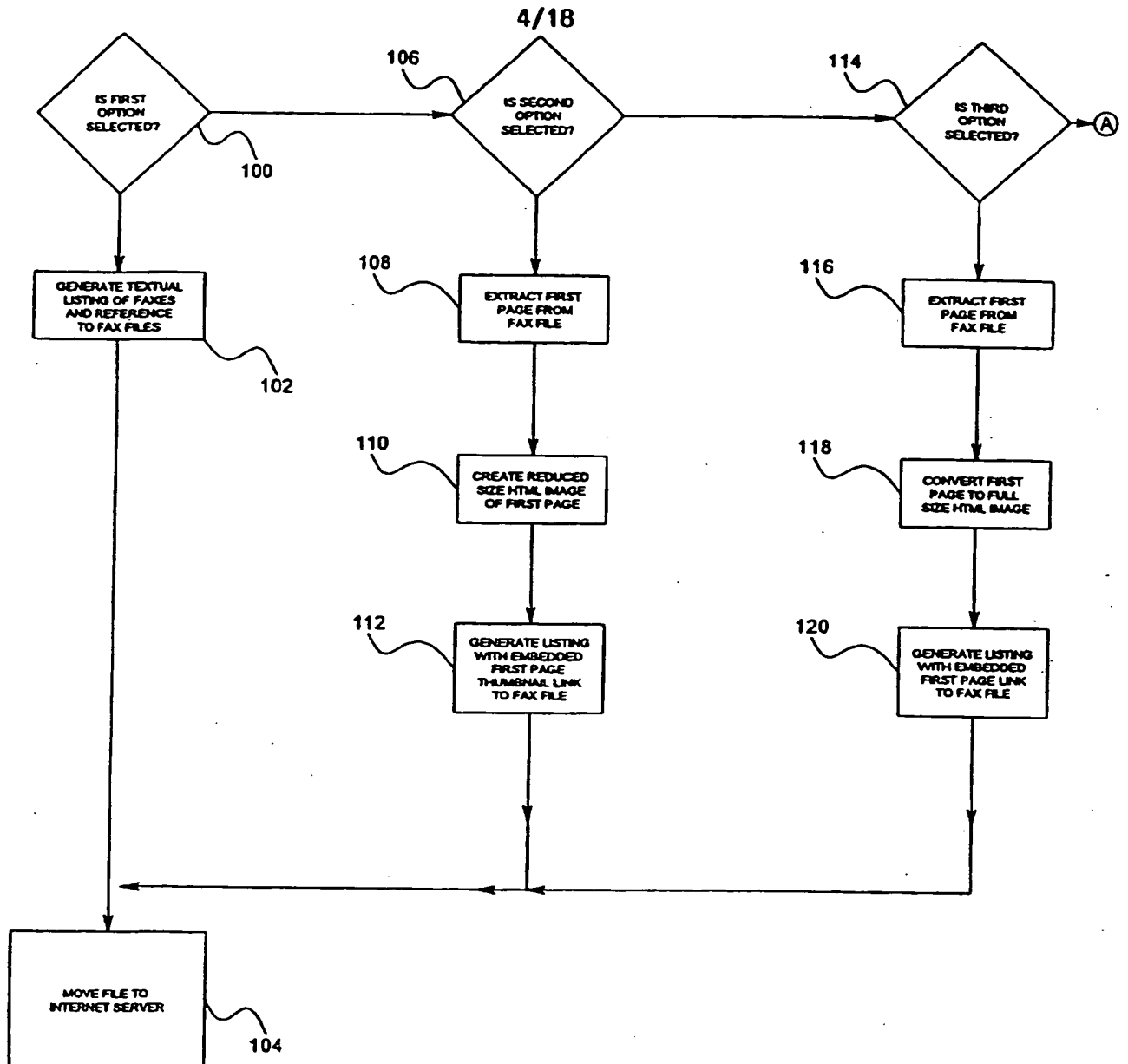


FIG. 4(A)

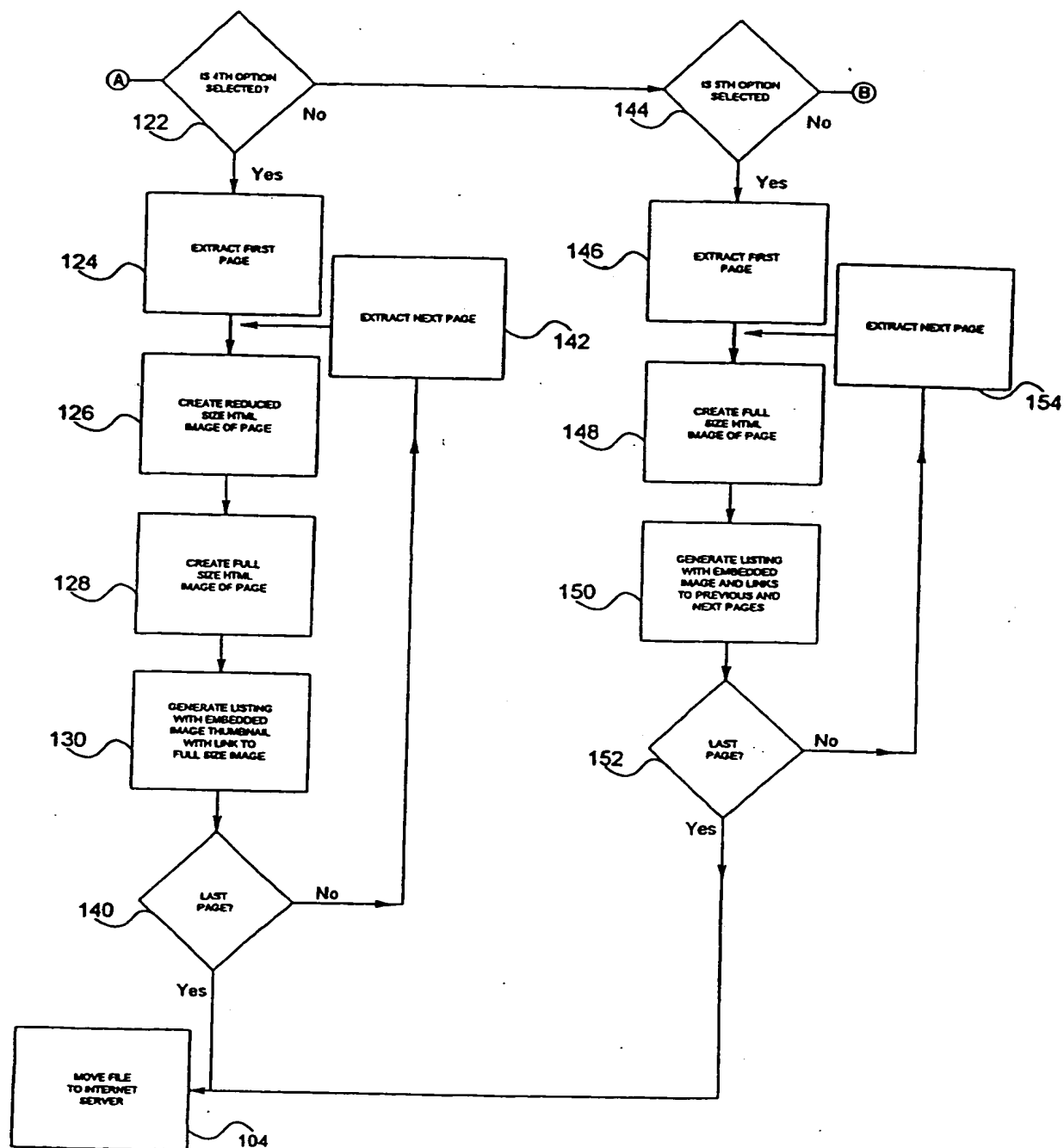


FIG. 4(B)

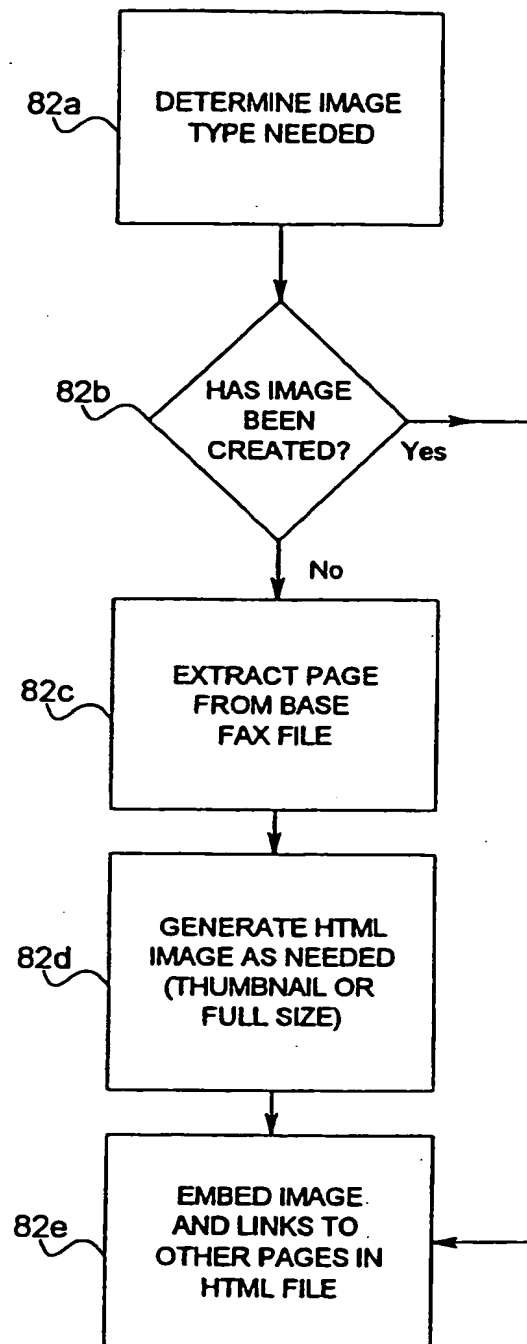


FIG. 5

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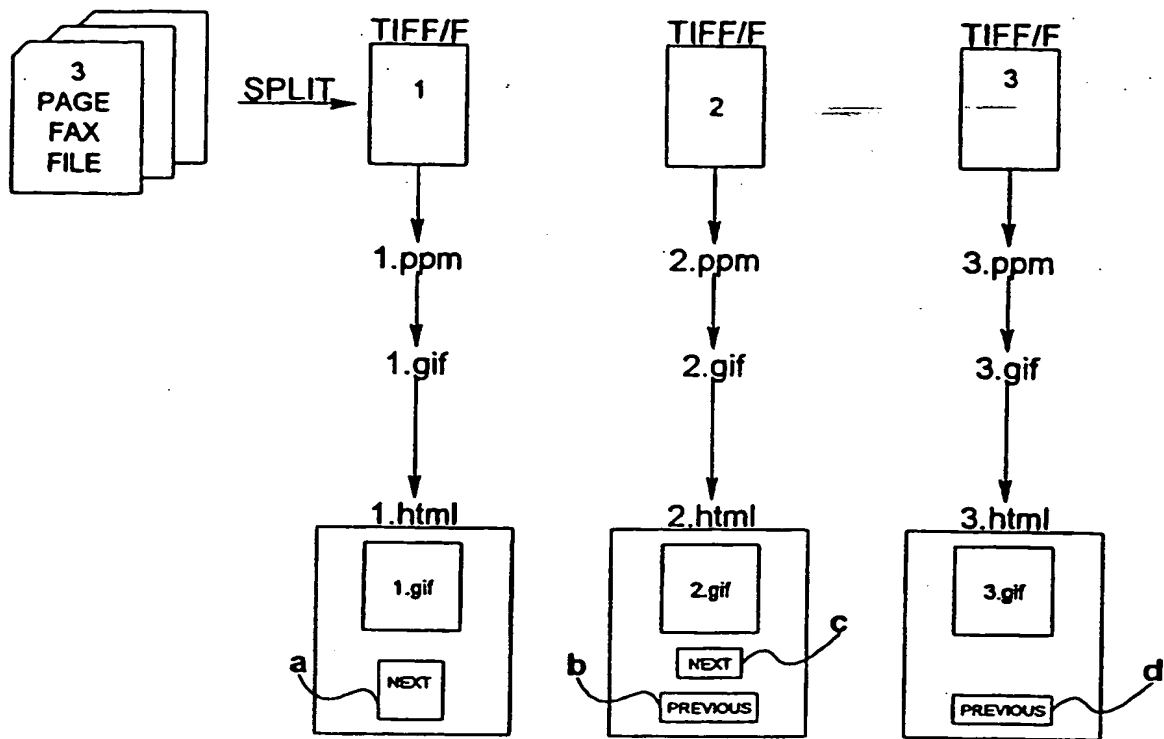


FIG. 6